

THE RELATIONSHIP BETWEEN TEACHER EMPATHY AND TEACHER
DEMAND UPON ACHIEVEMENT AS MEASURED BY FIRST
SEMESTER GRADE IN EARTH SCIENCE

by

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CHAPTER I

THE PROBLEM AND DEFINITION OF TERMS USED

I. THE PROBLEM

Statement of the problem. The purposes of this study were to isolate the effects of teacher demand and teacher empathy upon the student's achievement in eighth grade earth sciences.

Importance of the study. The significance of teacher demand and emotional contact between student and teacher and their relevance to achievement has been neglected in past research.

Since the establishment of the National Science Foundation, numerous science curricula have been organized. Each project manifests its efficiency on the basis of the quantity of material assimilated and the accomplishment of their behaviorial objectives. These educational objectives appear to neglect the characteristics of learners.

Psychological data does suggest that a student's emotional interactions while in the classroom are in part responsible for the formation of his attitudes concerning school. These attitudes to some degree govern the acceptance of his world. Many educators believe that the emotional climate of the classroom may also be an important factor in his achievement. Consequently, if through this project, evidence can be given showing a relationship between teacher empathy, teacher demand and resulting student achievement, then certain previously acceptable teaching techniques must be renovated to become appropriate.

II. OBJECTIVES OF THE STUDY

The objectives of this study stated as null hypotheses were:

1. There is no significant correlation between demand and student achievement in eighth grade earth science as measured by first semester marks for boys controlling the student's ability (VR+NA).
2. There is no significant correlation between teacher empathy and student achievement in eighth grade earth science as measured by first semester marks for boys controlling the student's ability (VR+NA).
3. There is no significant correlation between teacher demand and student achievement in eighth grade earth science as measured by first semester marks for girls controlling the student's ability (VR+NA).
4. There is no significant correlation between teacher empathy and student achievement in eighth grade earth science as measured by first semester marks for girls controlling the student's ability (VR+NA).

III. DEFINITION OF TERMS

Teacher demand in the study was defined as the requirements made by the teacher as these requests related to the different criteria for each of the assigned marks.

Teacher empathy in this study was defined as those positive and negative emotional interactions between student and teacher that were measurable with the Reed Attitude Inventory.

IV. DESCRIPTION OF THE POPULATION

The population for this study consisted of approximately four hundred students enrolled in eighth grade earth science at Old Mission Junior High School, Shawnee Mission, Kansas, during the 1967-68 school year.

Description of district. One of the nine junior high's in the Shawnee Mission High School District, Old Mission Junior High is located in the metropolitan area of greater Kansas City. The average intelligence quotient as measured by the Otis Mental Abilities Test for Old Mission Junior High is 112. This along with the median per family income of ten thousand dollars makes for a unique area in which to conduct such a study.

V. DESCRIPTION OF THE SAMPLE

The subjects for this study consisted of a random sample of 25 boys and 25 girls selected from 387 eighth grade students enrolled in earth science at the Old Mission Junior High School, Shawnee Mission, Kansas, during the 1967-68 school year.

TABLE I

ANALYSIS OF OTIS INTELLIGENCE
TEST FOR EIGHTH GRADE CLASS

An I.Q. Score of	Ranks a Student At, or Above, ___% of 7th Grade Students at O.M. in School Ability	And At, or Above, ___% of Students in the Nation
138	.....99%	
136	.....99%	99%
129	.....95%	
127	.....90%	
126	.....95%	95%
123	.....75%	
121	.....90%	90%
119	.....65%	
113.5	.....50%	
111	.....75%	75%
108	.....35%	
107	.....65%	65%
104	.....25%	
100	.....50%	50%
99	.....10%	
95	.....5%	
93	.....35%	35%
90	.....1%	
89	.....25%	25%
79	.....10%	10%
74	.....4%	4%
64	.....1%	1%
Mean 112.03 Mode 106		
Median 113.5 Range 15 ⁴ -79		

¹Information distributed by counselors to faculty of Old Mission

The population was distributed between my colleague and the author. After selection of the sample, the students belonging to Mr. Neelly were assigned the designation of group A and the author's students group B for purposes of compilation and discussion of results.

CHAPTER II

REVIEW OF THE LITERATURE

Much has been written in regard to pupil-teacher interactions, teacher characteristics, and classroom climate, but only research closely related to the one at hand will here be given.

I. TEACHER-PUPIL INTERACTION STUDIES

Cogan (1956) undertook a study of teacher-pupil interaction in terms of perceptions of the teacher by his students in relation to required and self-initiated work.¹ On the basis of research by Cogan and Ryan,² Reed hypothesized that teacher warmth, teacher demand, and utilization of intrinsic motivation must be affecting the student's success in the sciences.³

To evaluate these hypotheses, Reed (1961) constructed an instrument to measure these variables. After extensive reliability studies, Reed employed the factors as independent variables in a study designed to ascertain a possible relationship with the dependent variable, students' interest in science. The project involved a sample of thirty-eight teachers and classrooms of eighth

¹Morris L. Cogan, "Behavior of Teachers and Predicted Behavior of Their Pupils," Journal of Experimental Education, XXVII (December, 1958), 89-124.

²David G. Ryan, "Theory Development and the Study of Teacher Behavior," Journal of Educational Psychology, XXXVII (February, 1956), 462-465.

³Horace Reed, "Implications for Science Education of a Teacher Competence Research," Science Education, XXXVI (September, 1962), 474.

grade general science controlling the variables of the sex of the student.¹

Reed's results indicated a significant relationship (0.28) between teacher empathy and interest in science for girls and boys. The relationship between teacher demand and interest in science proved to be less conclusive. Reed was quoted as saying, "The relationship between teacher demand and pupils' science interests predicted a U-shaped pattern, with very low and very high demand discouraging interest and moderate demand encouraging interest."² Reed's results indicated no significant relationship between the boy or the girl sample.³

The most contemporary and timely study in the area of teacher-pupil interaction involved the investigation of personality characteristics of a group of physics teachers enrolled in a Harvard Project Physics institute during the summer of 1966. Walberg and Welch discovered a direct relationship between teaching attitudes as measured by the Minnesota Teacher Attitude Inventory and the teachers' knowledge of physics concepts. Teachers with a less adequate background in physics, in addition to scoring considerably lower on the Minnesota inventory, most significantly tended to be more introspective or introverted.⁴

According to Walberg and Welch, "One is led to suspect that physics

¹Ibid., p. 475.

²Reed, loc. cit.

³Ibid.

⁴Herbert J. Walberg and Wayne W. Welch, "Personality and Characteristics of Innovative Physics Teachers," Journal of Creative Behavior, I (Spring, 1967), 170.

teachers who do not have comprehensive grasp of their subject generalize their uncertainty and anxiety of their teaching and interpersonal relationships."¹

II. TEACHER EMPATHY AND DEMAND STUDIES

The preceding studies have dealt with several methods in interactional studies and instrument validation. A second study was the most extensive of Reed's investigations utilizing the Reed Attitude Inventory on a sample of 1045 ninth grade boys and girls. Reed's study (1962) researched the affects of teacher demand, teacher empathy, and the utilization of intrinsic motivation on the student's interest in science keeping as control variables: sex of the student, father's interest in science, school subject, and student's grade level. From the study Reed was able to draw the following conclusion:

1. When a moderate level of tension is established by the teacher's demands, the pupil is motivated to perform near the limits of his ability and/or willingness. In this situation frequent success results in the school work becoming enjoyable for own sake.²

The following conclusions appeared later in September 1961:

1. Relationship between pupil's perceptions of the teachers behavior that induces warmth and change criteria whether comprehensive and/or attitudinal will be significant, positive and of moderate strength.
2. When pupil change criteria are of an informational nature and are school goals (rewarded by marking system) the results will be low correlations or a negative relationship.³

¹Ibid.

²Horace B. Reed, "Teacher Variables of Warmth, Demand, and Utilization of Intrinsic Motivation Related to Pupils Science Interests: A Study Illustrating Several Potentials of Analysis of Variance and Covariance," Journal of Experimental Education, XXIX (March, 1961), 206-207.

³Horace B. Reed, "The Effects of Teacher Warmth," Journal of Teacher Education, XII (September, 1961), 333.

III. STUDIES RELATING ACADEMIC SUCCESS TO TEACHER-PUPIL INTERACTION

The entire review to this point has dealt with teacher classroom personality and to the factors of teacher demand, teacher empathy, and utilization of intrinsic motivation on interest in science. The researcher now discusses pertinent research done to relate classroom interaction between teacher and pupil and student academic achievement.

William Brookover, during the early 1950's at the University of Minnesota, conducted a research project concerned with pupil's achievement gains in relation to teacher's behavior for classes of eleventh grade United States history. Brookover formulated the assumption that a teacher who reduces interpersonal tension through an amiable approach also reduces the tension of school work.

In conducting the study, Brookover developed an instrument to measure teacher empathy. The informational achievement gains in United States history were measured by employing one of the Minnesota history achievement tests in the beginning and conclusion of the study.¹ The study indicated a negative relationship between teacher empathy and informational achievement gains in American history using as evidence a correlation of $r = -0.22$.²

Kemp and Munsee (1963) considered not only personality interaction between student and pupil but also the effect of intelligence on the interaction in an intriguing research study. Its aim was to investigate the junior

¹William B. Brookover, A Sociology of Education, (New York: American Book Company, 1955), pp. 298-299.

²Ibid., pp. 300-301.

high school student's perceptions of their teachers in relation to their intelligence, achievement in school, and their overall personality adjustment.

The research consisted of a random sample of one hundred and fifty students selected from an Ohio city. A list of characteristics describing the "best" as well as the "poorest" teacher they had experienced was then obtained to which a Q-sort was then given.¹ In addition, the California Short Form Test 1957 Form, the Iowa Test of Basic skills, and the California Test of Personality were given simultaneously to the random sample of students.

The following results of the study are given in their entirety because of the bearing of Kemp's work on the research of the author.

1. Students with higher intelligence perceived their teacher more positively than did those with lower intelligence.
2. Students with higher achievement perceived their teacher more positively than did those with low achievement.
3. Students with better personality adjustment scores perceived their teacher more positively than did those with lower personality adjustment scores.
4. A high correlation (0.90) was found between perceptions of a "real" and "ideal" teacher by the positive group (better prepared).
5. A marked correlation (0.78) was found in the perceptions of the "ideal" teacher for the positive and negative groups.
6. A correlation (0.44) was found between the negative group perception of "real" and "ideal" teacher.
7. A correlation (0.58) was found between "real" teacher by positive and negative groups.²

¹C. Gratton Kemp and Vera Munsee, "Junior High School Students' Perceptions of Teachers In Relation to Intelligence, Achievement, and Personality Adjustment," (Given at AERA 1963 National Convention in Chicago).

²Ibid., p. 4.

IV. INTERPRETATIONS AND CONCLUSIONS OF A REVIEW OF THE LITERATURE

First, the research in the area of teacher-pupil interactions of even nominal quantitative dimensions has appeared since the end of World War II. Previous to 1945, the author was able to find very little research dealing with teacher-pupil interaction studies.

Second, the acceptance of students being a judge of the teacher's performance underwent considerable educational criticism from about 1945, until the dawn of the space age in 1957. Prior to then, even the most progressive of educational theorists had considerable misgivings about the competency of students evaluating teacher effectiveness. Beginning with educational theorists and psychologists such as Cogan and Ryan, elaborate efforts were undertaken to ascertain the characteristics typical of a "good" teacher.

Third, with the impetus given by Sputnik I and the resultant establishment of the National Science Foundation, "crash" programs were established to determine those areas in which American education was lagging the Soviets. Through the work of men like Cogan, Ryan, and most recently Walberg, precedent studies of integrative teacher behavior, structural and affective relationships between teacher and student, and the social-psychological aspects of the classroom groups as a social system have resulted.

Fourth, in the area of effective science teaching, Horace Reed was the first educational researcher to apply the new knowledge gained concerning teacher-pupil interactions to the area of science education. In his classic study done in 1961, Reed related the factors of demand, empathy, and motivation to interest in science.

CHAPTER III

MATERIALS AND PROCEDURES EMPLOYED

I. DESCRIPTION OF SAMPLE

Using a table of random numbers, a sample of twenty-five boys and twenty-five girls was selected from the three hundred and eighty-seven eighth grade students enrolled at Old Mission Junior High School, Shawnee Mission, Kansas, during the 1967-68 school year.

The sample was selected from a school comprised of students having above average intelligence and family income; consequently, any conclusions or recommendations would be limited to schools with similar economic and academic characteristics.

II. DESCRIPTION OF MEASURES EMPLOYED

The Verbal Reasoning plus Numerical Ability (VR+NA) subscore Form L of the Differential Aptitude Test was utilized as a measure of the student's ability to comprehend science.¹ The authors of the Differential Aptitude Test assert these scores are aptitude measures of science comprehension when they state:

A large body of experimental evidence substantiates the belief that the DAT (VR+NA) does, in fact measure what is measured by

¹George Bennett, Harold G. Seashore, Alexander G. Weisman, The Differential Aptitude Test Form L (New York: The Psychological Corporation, 1966), pp. 5-4 - 5-6.

intelligence and scholastic aptitude tests and are effective predictors of future academic performance.¹

The reliability coefficients as they pertain to measuring the student's ability for science for eighth grade boys and girls on the (VR+NA) component of the test is $r = .92$.²

The Reed Attitude Inventory was developed to measure the student-teacher interaction as manifested in the categories of teacher empathy and demand as well as the utilization of intrinsic motivation. Its purpose is to obtain cardinal ranks of the intensity of student feelings toward their teacher. After extensive split-half correlations, reliability coefficients obtained were $r = .78$ for teacher demand and $r = .88$ for teacher empathy within a class.³

III. PROCEDURE AND RATIONALE

The Reed Attitude Inventory was given to the entire eighth grade class divided into twelve sections of earth science during class sessions on December 15, 1967, in my colleague's (Group A) and the author's (Group B) classes simultaneously. The rationale behind using the entire eighth grade class was to obtain not only maximum population size and assure the representative opinions but also to negate the influence of one teacher's personality and methods on the eventual outcome of the results.

The exchange of classrooms by the respective instructors during testing was also carried out. This was done to prevent the fear of reprisal by group

¹Ibid.

²Ibid., p. 6-2.

³Horace Reed, "Teacher Variables of Warmth, Demand . . ." 206-207.

A's teacher during and after test administration. The reason being that hopefully candid opinions from the students would be obtained.

Next, the random sample's (VR+NA) composite was procured and ranked ordinarily from 1-25 after considering the standard error of measurement. Subsequently, the empathy and demand subscores of the sample was calculated and also ranked from 1-25. These steps were taken immediately after the opinions were attained.

The semester marks for each member of the sample was obtained and then ranked on a scale of 11-0 with eleven being an A and zero an F. My colleague and I discussed at the beginning of the semester what a mark should consist of since both of us were using the ESCP materials. We decided jointly to base marks on the following criteria:

- (1) 40-50% on laboratory experiences (technique and participation)
- (2) 20-30% on class participation in discussions
- (3) approximately 20% on examinations

There was some variance between our relative percentages on grading criteria but no attempt was made to determine how much superior or inferior one mark was from another, neither between teachers or within groups A or B.

CHAPTER IV

PERTINENT RESEARCH FINDINGS

I. KENDALL PARTIAL CORRELATION

The statistical model utilized throughout this study was the nonparametric model known as the Kendall Partial Rank Correlation Coefficient ($T_{xy.z}$).¹ This model can be used to evaluate a hypothesis stating that a relationship exists between two variables, namely, teacher demand-empathy and first semester's mark in earth science, with a third variable, ability to comprehend science. This method of partial correlation is valid when at least ordinal ranking is possible. In partial correlation, the effect by the third variable upon the relationship between the independent and dependent variables is eliminated.²

The decision for employing a non-parametric statistic is based on the following reasons cited by Siegel.

1. Non-parametric statistics do not assume that the scores were drawn from a normally distributed population.
2. They are most effective with variables capable of only simple rank.
3. Usefulness with small samples.

¹Sidney Siegel, Non Parametric Statistics For the Behavioral Sciences (New York: McGraw-Hill Book Company, 1956), p. 223.

²Ibid.

4. Computational simplicity.¹

The independent variables in this study were the teacher demand and empathy subscores; the dependent variables were rank of first semester mark and (VR+NA) subscore. As N becomes larger the following method becomes more practical in terms of computational efficiency.

$$T_{xy.z} = \frac{T_{xy} - T_{zy} T_{xz}}{\sqrt{(1 - T_{xy}^2)(1 - T_{xz}^2)}}^2$$

T_{xy} - correlation between the ordinal ranking of the independent variable and the first semester mark

T_{zy} - correlation between the ordinal ranking of the (VR+NA) subscore and the first semester mark

T_{xz} - correlation between the ordinal ranking of the independent variable and VR+NA subscore.

The assumptions involved in the non-parametric statistical model are few and simple, namely, that the observations are independent and that the variables under study have underlying continuity.³

II. TYPES AND LOCATION OF RELEVANT DATA

In completing this study certain tables of pertinent data were constructed to facilitate interpretation of the results. Tables III and VI present the raw scores of the boys and girls on the two independent and dependent variables.

Tables IV and V pertain to the ordinal and sequential ordinal ranking of

¹Ibid., p. vii.

²Ibid., p. 226.

³Ibid., p. 31.

each boy on the variables; tables VII and VIII refer to girls scores respectively. All of the above tables are included in the Appendix as well as a copy of the Reed Attitude Inventory.

On the basis of the Kendall Partial Rank correlation coefficients, the following results were obtained concerning the hypotheses:

III. VERIFICATION OF HYPOTHESES

1. There is no significant correlation between demand and student achievement in eighth grade earth science as measured by first semester's marks for boys controlling the student's ability (VR+NA).
2. There is no significant correlation between teacher empathy and student achievement in eighth grade earth science as measured by first semester marks for boys controlling the student's ability (VR+NA).
3. There is no significant correlation between teacher demand and student achievement in eighth grade earth science as measured by first semester marks for girls controlling the student's ability (VR+NA).
4. There is no significant correlation between teacher empathy and student achievement in eighth grade earth science as measured by first semester marks for girls controlling the student's ability (VR+NA).

On the basis of the resulting partial correlations in Table II for both the boy and girl sample all four null hypotheses were retained.

TABLE II
PARTIAL CORRELATION COEFFICIENTS FOR THE
TWO INDEPENDENT VARIABLES
IN THE SAMPLE

	Boy's First Semester Mark	Girl's First Semester Mark
Teacher Demand	- .148	- .112
Teacher Empathy	.064	.314
N = 50 (25 Boys and 25 Girls)		
.406 necessary to be significant		
at $p \leq .05$		

Note: The (VR+NA) was partialled out of all correlations. All preliminary tables are found in the appendix.

IV. PERTINENT CONCLUSIONS AND INTERPRETATIONS

Following carefully study of Tables III and VI in the appendix and the resulting correlations in Table II, the relationship between academic demands made by the teacher during the first semester and the resultant mark is a confusing one. The negative correlation, even though not statistically significant, tends to suggest that regardless of the expectations of the teacher for his students to complete the assigned work successfully, the student heeds little but is driven by his own goals in earth science. These goals frequently are not those of a successful and meaningful experience. This apparent trend not only applies to the boys in groups A and B but, in addition, to the girls in groups A and B at Old Mission Junior High. By constantly reminding the students of his requirements during the year, the instructor is treating only the symptoms of the problem and not the problem itself. The issue is one of not recognizing the importance or the applicability of earth science to the student's everyday life as a citizen of the twenty-first century. The

problem then for instructors is one of communicating the values of studying earth science; then, the student's goals and the teachers may be more in line rather than in opposition.

The partial correlation between teacher empathy and the girls first semester marks (0.314), though not significant, does suggest a possible relationship. If the reader will again refer to Table II, there is a considerable difference in teacher empathy and the boys resultant achievement as opposed to the girls. Since both instructors involved in the study were men, the sex of the teacher could effect this apparent difference in empathetic relationships. The author believes that because of the age group involved and the girls becoming more aware of the male both as boys and men, amiable, one sided emotional relationships might exist between girl students and the two men teachers. If this could be proven valid, there resultant success in earth science could be one of gaining favor with the teacher more than a desire to study earth science for its inherent value. The boys however are frequently involved in other more apparent social and athletic events rather than being affected by empathetic interactions with their men teachers. There academic success probably depends more on their interest rather than emotional relationships in earth science.

V. EXTENUATING PHYSICAL AND EDUCATIONAL FACTORS AFFECTING CONCLUSIONS

The following section was added to allow both author and reader to assess the results in light of a few crucial factors and implications. Future research will need to consider them.

The size of the sample and population definitely introduces some skepticism concerning the results. The purpose in utilizing such a small population

was to fulfill the purpose of the author that of determining what emotional factors affect the academic performance in the author's classes, and not to generalize by studying the entire district.

In preliminary designing of the study, the author considered having as a population all nine junior highs, but after attempts to undertake this to improve the validity of the results, administrative problems and the interval of time allowable made implementation difficult and in violation of the author's purpose.

Between class differences in terms of academic demands made upon the twelve classes were kept to a minimum consistent with variations in ability within each of the classes. Both groups A and B were taught earth science using the Earth Science Curriculum Project Materials (ESCP) including texts and laboratory equipment. The academic goals and philosophy of teaching the program would provide some commonality in academic demand and expected performance.

Variation in the empathy subscore, reflecting differences in teaching philosophy and attitudes, was encountered. Differences between the two teachers were curtailed by having about an equal number of subjects in both groups A and B from the classes of each teacher; however, some classes by virtue of their temperament lend themselves too much more amiable relationships between the students and the teacher in a particular class. Thus the differences in both teachers and classes still exist only in varying degrees some of which are at least partially controllable.

In discussing the relationship of emotional and psychological factors in the classroom, verification of their existence is necessary. The existence of an emotional relationship between students and teacher, both in a positive

and negative sense, was present in both groups A and B; however, definitely on a continuum scale.

The existence of academic demand is on a much more solid basis. The ESCP curriculum project employed by both teachers requires considerable academic and inquisitive concentration in the laboratory exercises, discussions, and writeups. Careful work in pre-lab, laboratory, and post-lab is required for successful completion of the course.

VI. RECOMMENDATIONS FOR FURTHER RESEARCH

The researcher believes that only an inroad into the area of quantitative determination of the emotional and academic factors affecting the mark obtained in earth science has been accomplished here. The results, though somewhat disappointing in terms of the conclusions obtained, deserve at least some consideration. In the opinion of the investigator, the study should be replicated with the following refinements in the experimental design.

1. More adequate between and within class sampling.
2. Increased population size
3. Evaluation of teacher personality factors for those involved
4. Employment of Earth Science Curriculum Standardized tests at the end of the first semester

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APPENDIX

TABLE III
RAW SCORES OF BOYS ON INDEPENDENT
AND DEPENDENT VARIABLES

Subject	Empathy Subscore	Demand Subscore	VR+NA	First Semester's Grade
1	40	41	60	C-
2	51	36	50	C+
3	47	28	3	C-
4	56	40	85	B+
5	54	41	60	C
6	45	32	55	B-
7	40	34	85	A-
8	51	41	45	A-
9	49	43	40	C
10	43	41	15	C-
11	43	43	97	A-
12	44	35	99	B+
13	25	53	40	C
14	43	41	50	C
15	48	40	75	B+
16	42	37	95	B-
17	47	43	70	C+
18	38	45	25	D
19	58	45	20	C-
20	48	38	80	B
21	43	36	15	D+
22	61	42	70	C
23	51	41	95	B+
24	46	52	40	C
25	50	42	10	C-

*The standard error of measurement for boys of 3.1 was considered in setting up ordinal ranks for VR+NA.

TABLE IV

ORDINAL RANKING OF BOYS
ON DEMAND, EMPATHY, AND VR+NA

SUBJECT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TEACHER DEMAND																									
6	10	14	7	6	13	12	6	4	6	4	4	11	1	6	7	9	4	3	3	8	10	5	6	2	5
RANK CORRECTED FOR TIES	12.5	20.5	25	16.5	12.5	24	23	12.5	5.5	12.5	5.5	22	1	12.5	16.5	19	5.5	3.5	3.5	18	20.5	8.5	12.5	2	8.5
TEACHER EMPATHY																									
15	5	9	3	4	11	15	5	7	13	13	13	12	17	13	8	14	9	16	2	8	13	1	5	10	6
RANK CORRECTED FOR TIES	22.5	6	12.5	3	4	15	22.5	6	9	18.5	18.5	16	25	18.5	10.5	21	12.5	24	2	10.5	18.5	1	6	14	8
VR+NA																									
7	9	16	3	7	8	3	10	11	14	1	1	1	11	9	5	2	6	12	13	4	14	6	2	11	15
RANK CORRECTED FOR SEMESTER AND TIES	11.5	14.5	25	5.5	11.5	13	5.5	16	18	22.5	1.5	1.5	18	14.5	8	3.5	9.5	20	21	7	22.5	9.5	3.5	18	24
FIRST SEMESTER'S GRADE																									
7	5	7	2	6	4	1	1	6	7	1	1	2	6	6	2	4	5	9	7	3	8	6	2	6	7
RANK CORRECTED FOR TIES	21	11.5	21	5.5	15.5	9.5	2	2	15.5	21	2	5.5	15.5	15.5	5.5	9.5	11.5	2.5	21	8	24	15.5	5.5	15.5	21

TABLE V (cont.)

SEMESTER GRADE RANK														
2	2	2	5.5	5.5	5.5	5.5	8	9.5	9.5	11.5	11.5	11.5	15.5	15.5
22.5	6	18.5	3	16	10.5	6	10.5	15	21	6	12.5	4	9	25
EMPATHY SUBSCORE														
22.5 6 18.5 3 16 10.5 6 10.5 15 21 6 12.5 4 9 25 18.5 1 14 22.5 12.5 18.5 21 21 21 21 21 24 25														
SEQUENTIAL ORDINAL RANKING OF														
BOYS SEMESTER GRADE AND														
EMPATHY SUBSCORE														
(VR+NA) RANK														
1	5	1	3	5	3	5	5	5	5	7	8	9	5	9
18.5	16	21	6	3	22.5	10.5	10.5	12.5	1	22.5	4	15	6	18.5
EMPATHY SUBSCORE														
18.5 16 21 6 3 22.5 10.5 10.5 12.5 1 22.5 4 15 6 18.5 6 14.5 14.5 16 18 18 20 21 22.5 22.5 24 25														
SEQUENTIAL ORDINAL RANKING OF														
BOYS (VR+NA) AND														
EMPATHY SUBSCORE														
18.5 16 21 6 3 22.5 10.5 10.5 12.5 1 22.5 4 15 6 18.5 6 14.5 14.5 16 18 25 14 24 2 18.5 18.5 8 12.5														

TABLE VI
RAW SCORES OF GIRLS ON INDEPENDENT
AND DEPENDENT VARIABLES

Subject	Empathy Subscore	Demand Subscore	VR+NA	First Semester's Grade
1	16	32	80	F
2	40	37	70	D+
3	43	43	60	C
4	50	33	80	B-
5	39	38	45	C
6	40	37	90	B+
7	44	41	30	C
8	46	34	99	A-
9	41	42	25	B-
10	46	39	70	B-
11	31	49	50	C
12	48	39	20	D+
13	45	39	70	B-
14	38	39	70	C
15	47	42	70	C+
16	47	40	55	C+
17	51	44	85	B-
18	44	57	75	B
19	56	36	75	B
20	60	36	80	A-
21	42	48	75	B
22	37	43	97	B-
23	24	46	50	C
24	33	35	25	C
25	41	38	55	B+

*The standard error of measurement for girls of 2.6 was considered in setting up ordinal ranking of VR+NA.

TABLE VII
ORDINAL RANKING OF GIRLS
ON DEMAND, EMPATHY, AND VR+NA

SUBJECT		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TEACHER DEMAND		17	12	6	16	11	12	8	15	7	10	2	10	10	10	7	9	5	1	13	13	13	4	14	11	16
RANK CORRECTED FOR TIES		25	18.5	6.5	24	16.5	18.5	10	23	8.5	14	2	14	14	14	8.5	11	5	1	20.5	20.5	20.5	4	22	16.5	17
TEACHER EMPATHY		20	13	10	4	14	13	9	7	12	7	18	5	8	15	6	6	3	9	2	1	16	19	17	12	15
RANKS CORRECTED FOR TIES		25	17.5	13	4	19	17.5	11.5	8.5	15.5	8.5	23	5	10	20	6.5	6.5	3	11.5	2	1	21	24	22	15.5	16
VR+NA		4	6	7	4	10	2	11	1	12	6	9	13	6	6	6	8	3	5	5	4	1	9	12	8	8
RANK CORRECTED FOR SEMESTER AND TIES		6	13	16	6	21	3	22	1.5	23.5	13	19.5	25	13	13	13	17.5	4	9	9	6	1.5	19.5	23.5	17.5	17.5
FIRST SEMESTER'S GRADE		8	7	7	4	6	2	6	1	4	4	6	7	4	6	5	5	4	3	3	1	4	6	6	2	6
RANK CORRECTED FOR TIES		25	23	23	10.5	18	3.5	18.5	1.5	10.5	10.5	18.5	23	10.5	18.5	14.5	14.5	10.5	6	6	1.5	10.5	18.5	18.5	3.5	18.5

TABLE VIII

SEQUENTIAL ORDINAL RANKING OF GIRLS, DEMAND, EMPATHY, AND VR+NA

SURJECT		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		

SEMESTER GRADE RANK

[illegible]

DEMAND SUBSCORE RANK

2005	23	20	5	18.5	16.5	1	20.5	20.5	24	8.5	14	5	6.5	8.5	11	16.5	10	2	14	4	22	18.5	6.5	11	25
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SEQUENTIAL ORDINAL RANKING OF GIRLS SEMESTER GRADES AND DEMAND SUBSCORE

[illegible]

DEMAND SUBSCORE

	23	6.5	18.5	5	25	24	20.5	1	20.5	20.5	14	14	8.5	6.5	11	16.5	2	6.5	16.5	10	8.5	22	14
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SEQUENTIAL ORDINAL RANKING OF
GIRLS (VR+NA) AND DEMAND SUBSCORE

SENIOR GRADE RANK														
1	1.5	1.5	3.5	6	6	6	10.5	10.5	10.5	10.5	18.5	23	23	25

$$\frac{(VR+IA)}{RANK}$$

	1.5	6	3	19.5	9	9	9	6	23.5	13	4	1.5	13	17.5	21	22	19.5	13	19.5	23.5	13	16	25	6
	1.5	6	3	19.5	9	9	9	6	23.5	13	4	1.5	13	17.5	21	22	19.5	13	19.5	23.5	13	16	25	6

SEQUENTIAL ORDINAL RANKING OF
GIRLS SEMESTER GRADE RANK
AND (VR+NA)

TABLE IX
REED ATTITUDE INVENTORY

Write the number of your answer in the space at the right. Remember that there are no right or wrong answers. Be sure to give your honest opinion.

1. This teacher insists that pupils try to do their science work neatly (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
2. This teacher cares how I feel about things (1) not at all. (2) a little. (3) somewhat. (4) much. (5) very much. _____
3. Of the science work we cover, this teacher's tests include (1) not nearly enough. (2) almost enough. (3) just enough. (4) somewhat too much. (5) much too much. _____
4. The assignments this teacher gives are difficult for me (1) not nearly often enough. (2) almost often enough. (3) just often enough. (4) somewhat too often. (5) much too often. _____
5. This teacher has made friends with (1) almost none of us. (2) few of us. (3) some of us. (4) many of us. (5) almost all of us. _____
6. This teacher insists that we try to improve our work (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
7. This teacher has a kindly way of talking to pupils during class (1) almost never. (2) few times. (3) sometimes. (4) many times. (5) almost always. _____
8. The quizzes and tests this teacher gives are difficult for me (1) not nearly often enough. (2) almost often enough. (3) just often enough. (4) somewhat too often. (5) much too often. _____
9. This teacher laughs and smiles (1) almost never. (2) few times. (3) sometimes. (4) often. (5) very often. _____
10. This teacher demands that we do our science reading carefully (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____

11. This teacher insists on an explanation from a pupil who doesn't do the science work (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
12. This teacher insists that I do the very best I can with my science work (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
13. This teacher is considerate of pupils (1) almost never. (2) few times. (3) sometimes. (4) many times. (5) almost always. _____
14. This teacher insists that we pay attention during discussion periods (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
15. This teacher insists that we pay attention during question periods (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
16. This teacher makes me feel that I am welcome in this classroom (1) not at all. (2) a little. (3) somewhat. (4) much. (5) very much. _____
17. This teacher would be willing to talk with me about non-science things that were bothering me (1) not at all. (2) a little. (3) somewhat. (4) much. (5) very much. _____
18. This teacher insists that we keep working during the class period (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
19. This teacher would put aside his (her) own work if I asked for advice about personal problems (1) almost never. (2) few times. (3) sometimes. (4) many times. (5) almost always. _____
20. This teacher insists that we hand our science work in on time (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
21. This teacher has a good-natured way of talking in class (1) almost never. (2) few times. (3) sometimes. (4) many times. (5) almost always. _____
22. There is a feeling of friendliness between this teacher and me (1) almost never. (2) few times. (3) sometimes. (4) often. (5) very often. _____

23. This teacher insists that we pay attention when he (she) talks to us about the lesson (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
24. During class discussions, this teacher insists that we be orderly. (1) not nearly strongly enough. (2) almost strongly enough. (3) just strongly enough. (4) somewhat too strongly. (5) much too strongly. _____
25. This teacher is careful about the feelings of pupils in this class (1) not at all. (2) a little. (3) somewhat. (4) much. (5) very much. _____
26. This teacher chats socially with pupils (1) almost never. (2) few times. (3) sometimes. (4) often. (5) very often. _____
27. This teacher praises us (1) not at all. (2) a little. (3) somewhat. (4) much. (5) very much. _____

THE RELATIONSHIP BETWEEN TEACHER EMPATHY AND TEACHER
DEMAND UPON ACHIEVEMENT AS MEASURED BY FIRST
SEMESTER GRADE IN EARTH SCIENCE

by

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B. S., Kansas State University, 1966

AN ABSTRACT OF A MASTER'S REPORT

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I. STATEMENT OF THE PROBLEM

The purposes of this study were to isolate the effects of teacher demand and empathy upon the student's achievement in eighth grade earth science taking into account the student's ability to comprehend science. This was accomplished by working from the following four null hypotheses:

1. There is no significant correlation between demand and student achievement in eighth grade earth science as measured by first semester marks for boys controlling the student's ability (VR+NA).
2. There is no significant correlation between teacher empathy and student achievement in eighth grade earth science as measured by first semester marks for boys controlling the student's ability (VR+NA).
3. There is no significant correlation between demand and student achievement in eighth grade earth science as measured by first semester marks for girls controlling the student's ability (VR+NA).
4. There is no significant correlation between teacher empathy and student achievement in eighth grade earth science as measured by first semester marks for girls controlling the student's ability (VR+NA).

II. DEFINITION OF TERMS

Teacher demand in the study was defined as the requirements made by the teacher as these requests related to the different criteria for each of the assigned marks.

Teacher empathy in this study was defined as those positive and negative emotional interactions between student and teacher that were measurable with the Reed Attitude Inventory.

III. METHODS AND PROCEDURES EMPLOYED

Beginning with the entire eighth grade class at Old Mission Junior High (387), a random sample of twenty-five girls and twenty-five boys was selected. The (VR+NA) subscore and the first semester mark in earth science were obtained and ordinally ranked.

On December 15, 1967, the Reed Attitude Inventory was administered to all eighth students. The Inventory is a systematically constructed instrument designed to measure the opinion of students concerning their emotional contact with the teacher as well as to ascertain to what degree they believed academic demands were made upon them by the instructor. These subscores were also ranked ordinally. After all data were collected, the Kendall Partial Rank Correlation Coefficient, a non-parametric statistic, was then utilized.

IV. PERTINENT FINDINGS

The following conclusions are based upon the four null hypotheses; all were accepted as indicated.

Hypothesis #1	$r = -.148$ at $p \leq .05$
Hypothesis #2	$r = .064$ at $p \leq .05$
Hypothesis #3	$r = -.112$ at $p \leq .05$
Hypothesis #4	$r = .314$ at $p \leq .05$